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Engineering strategies to enable flexible superconducting qubits fabrication

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Abstract

As superconducting quantum circuits grow increasingly complex, ensuring reliable and scalable fabrication becomes critical to advancing quantum hardware. In this presentation, we discuss key engineering strategies that enable our fabrication platform to meet these challenges. A key feature of our platform is that it is made available to the community, allowing for chip design using our established fabrication processes. This open-access model provides researchers and developers with the flexibility to implement and test their quantum architectures while ensuring high-quality and high-yielding manufacturing outcomes.

The core of the presentation delves into how we optimize Josephson junctions, ensuring cross-customer compatibility while maintaining precise control over critical parameters. We also present coherence results, focusing on T1 and T2 as implemented in realistic quantum processors, showcasing our capability to meet the demands of practical quantum computing applications. As our last topic, we delve into post-fabrication methods, such as targeting resonators and fine-tuning designs, which allow us to further refine device performance after initial fabrication.